

REMARKS

The foregoing amendment is submitted to correct an error which appears in the examples of the application. The examples as originally filed were written in the past tense indicating that the work described therein had actually been performed. In fact, the examples are "paper examples" and the amendment is submitted to present the examples in the present tense (i.e. "prophetic examples"). This matter was previously discussed with Examiner Clardy. It is apparent that no new matter has been added to the application by the amendment and entry thereof is deemed proper and is respectfully requested.

Claims 1-5 stand rejected as obvious over the combined teachings of Rosen (U.S. Patent No. 3,851,653), Murray (U.S. Patent No. 6,054,318) and Felton (U.S. Patent No. 3,303,326). Murray is stated to teach treating tobacco with hydrogen peroxide to reduce the nicotine content. Murray and Felton are stated to address the effect of glucose oxidase on plants. Rosen is stated to teach that hydrogen peroxide reduces nicotine in tobacco. The Office Action concludes that one of ordinary skill in the art would surmise that since glucose oxidase was known to increase hydrogen peroxide concentration, then glucose oxidase would also be expected to reduce nicotine concentration. The rejection is hereby traversed and reconsideration is respectfully requested.

The present invention is directed to a method of reducing the nicotine content of a tobacco plant by applying to the tobacco plant an effective amount of a nicotine reducing agent (e.g. glucose oxidase, gluconic acid, hydrogen peroxide and combinations thereof). The "effective amount" is an amount sufficient to inhibit the synthesis of nicotine in the tobacco plant. The resulting nicotine content (i.e. the amount of nicotine) in the plant will provide a tobacco product made from the plant with a non-addictive level of nicotine such that the user does not exhibit an addictive level of nicotine in the central nervous system blood plasma. A further feature of the present invention is the inhibition of nicotine production in the tobacco plant in a selective manner without appreciably affecting the other constituents in the tobacco plant as is customarily associated with such prior art processes as steam extraction and chemical extraction. The present method can be performed on tobacco plants *in situ* (i.e. tobacco plants that grow in a field).

In the present invention, the nicotine reducing agent, as defined on page 10 of the present application, includes active compounds which when administered to a tobacco plant, react with nicotine in the tobacco plant thereby converting the nicotine to non-nicotine containing compounds. The present method achieves a reduction in the nicotine content of the tobacco plant to the extent that there results a consequential non-addictive amount of nicotine in a tobacco product made therefrom.

Rosen (U.S. Patent No. 3,851,653) is directed to the treatment of tobacco

leaves or shredded form thereof (column 2, lines 17-24). The tobacco is treated with an aqueous solution containing a given amount of hydrogen peroxide which is one of the nicotine reducing agents specifically identified in the present application. However, instead of reacting the hydrogen peroxide with the nicotine to lower the nicotine content in the tobacco, the hydrogen peroxide of the reference reacts with an amount of added catalase sufficient to cause decomposition of the hydrogen peroxide into gaseous components including oxygen. The generation of gaseous components increases the volume of the treated tobacco (column 1, lines 52-64). Thus, the purpose of the reference invention is to increase the volume of the tobacco by "puffing" the tobacco. When the volume of the tobacco is increased and the amount of nicotine contained in the tobacco remains the same, there is a reduction in the nicotine concentration simply because of the increase in volume of the tobacco. However, there is no reduction in the nicotine content of the tobacco plant. That is, if the volume increases and the amount of nicotine remains the same, the amount of nicotine per unit volume decreases (i.e. the concentration of the nicotine is reduced).

It can therefore be observed that the present invention provides for the reaction of the nicotine reducing agent with the nicotine to thereby reduce the nicotine content of the treated plant. To the contrary, Rosen teaches the catalytic decomposition of hydrogen peroxide to form gaseous components including oxygen with a reduction in nicotine concentration (not content) resulting from the increased volume of the "puffed" tobacco.

It is noted that some of the oxygen produced by the decomposition of hydrogen peroxide reacts with the nicotine to convert the same to a non-nicotine compound. However, it is clear from the Rosen reference that hydrogen peroxide is not reacting with the nicotine but is instead catalytically converted to gaseous components to "puff" the tobacco while incidentally having some oxygen react with the nicotine. Thus, Rosen requires additional process steps and reactants (i.e. catalase) which are not employed in the present invention. Rosen seeks to achieve an increase in the volume of the tobacco and only incidentally does some of the gaseous oxygen react with nicotine. However, there is no teaching or suggestion that this incidental reaction reduces nicotine levels to the extend achieved in the present invention.

Murray (U.S. Patent No. 6,054,318) relates to the production of transgenic organisms that express a glucose oxidase gene which produces a product that is toxic to economically important pests and diseases of crops (column 1, lines 5-9). The characterization of a glucose oxidase gene has enabled the production of a plant capable of producing a product which is toxic to certain insects. However, the reference falls far short of teaching or suggesting the presently claimed invention. First, the present method requires applying to the tobacco plant an effective amount of a nicotine reducing agent. This effective amount must be sufficient to inhibit the synthesis of nicotine (i.e. reduce the amount of nicotine in the tobacco plant) to achieve a non-addictive level of nicotine in the tobacco product prepared from the tobacco plant.

There is no teaching or suggestion in Murray that the amount of the enzyme is sufficient to achieve the beneficial effects of the method of the present invention related to non-addictive nicotine levels. The only discussion of the effect of the enzyme is its ability to repel insects. There is no disclosure that the amount of glucose oxidase generated by the plant has any meaningful effect on the nicotine content of the plant and one can only surmise that no such effect is obtained.

Felton discloses the isolation and purification of a glucose oxidase salivary enzyme from *Helicoverpa*. When the enzyme isolated in accordance with the reference invention is applied to plants, it triggers disease and insect resistance systematically throughout the plant. However, there is no teaching or suggestion that the levels of glucose oxidase used to repel insects would be sufficient to achieve a reduction in nicotine content of the tobacco plant that yields a non-addictive level of nicotine in the central nervous system blood plasma of the user who uses a tobacco product made from that plant.

The Office Action acknowledges in the paragraph bridging pages 2 and 3 that Felton does not recognize any effect on nicotine in tobacco plants which are exposed to the reference enzyme. The Office Action, however, speculates that reduced nicotine production would necessarily occur. However, a reduction in nicotine, even if that were to occur, is not a teaching or suggestion that the resulting nicotine content in the plant treated yields a non-addictive level of nicotine which is the purpose behind the present invention. Thus, the present invention is not only the

discovery that certain agents can be applied to tobacco plants to reduce the nicotine content but that these agents can be applied in amounts which can achieve non-addictive levels of nicotine in tobacco products made from the plants.

In view of the foregoing, Applicant submits that the references alone or in combination do not teach one of ordinary skill in the art or provide a suggestion of the invention as currently claimed in the present application. Early passage to issue of the present application is therefore deemed proper and is respectfully requested.

It is believed that no fee is due in connection with this matter. However, if any fee is due, it should be charged to Deposit Account No. 23-0510.

Respectfully submitted,



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